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Customer No.: 07278   Docket No.: 06727/000H370-USO

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Application of : CARMEL et al.

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Serial No.: 09/606,326   : Group Art Unit: 2654

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Filed   : June 29, 2000   : Examiner: Lamont M. Spooner

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For   : MORPHOLOGICAL DISAMBIGUATION

March 1, 2004

RESPONSE TO OFFICIAL ACTION

Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

In response to an Official Action dated December 1, 2003, Applicant submits the following remarks.

Applicant thanks Examiners Spooner and Smits for the courtesy of an interview held with Applicant's representative, Sanford T. Colb (Reg. No. 26,856), in the USPTO on February 25, 2004. The substance of the interview is set forth in the Interview Summary that was prepared by the Examiner.

Claims 1, 4-7, 13-16, 19, 22, 25-29 and 32-35 were rejected under 35 U.S.C. 102(e) over Jacquemin et al. (U.S. Patent 6,101,492). Claims 2, 3, 17, 18, 23, 24, 30 and 31 were rejected under 35 U.S.C. 103(a) over Jacquemin. Applicant respectfully traverses these rejections.

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Claim 1 recites a method for disambiguation of an
input string based on the morphological pattern of the
string.   The string is morphologically analyzed to
generate a list of candidate analyses, each comprising a
word and its linguistic pattern.   The patterns are then
evaluated against a predefined criterion in order to
select one or more of the analyses from the list.   The
technique may be used, *inter alia*, to prune the number of
analyses of the words in a document that are included in
a search index (page 6, lines 6-9, in the specification).

As defined in the present patent application (page
5, lines 8-14), the "pattern" of a word consists of a
certain combination of linguistic characteristics that is
provided by a morphological analyzer.   In the field of
linguistics, morphology looks at the pattern of the
individual word itself, independent of its meaning or
context.   Elements of the pattern of a word include, for
example, the part of speech, prefix, number, gender,
person, tense and conjugation model (page 5, lines 12-
14).   By contrast, syntactic analysis is inherently
context-dependent: It looks at the sentence structure and
relations among different words.   The dichotomy between
morphological and syntactic analysis is well-established
in the art of linguistics.   Jacquemin himself makes this
distinction clear (see, for example, col. 2, lines 53-54
and 66-67).

Jacquemin describes a system for generating an index
that combines morphological and syntactic analysis.   A
corpus is provided to an "inflectional analyzer," which
uses morphological analysis to provide all possible
lemmatizations of the original corpus (i.e., all possible
morphological analyses of the words in the corpus).   A
disambiguator then employs syntactic analysis to perform
disambiguation of the words in the lemmatized corpus.
Next, a derivational analyzer expands the corpus to
contain all possible derivatives of the disambiguated

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corpus, following which a transformational analyzer conflates term variants in the expanded corpus using a grammar and metagrammar (col. 3, line 53 - col. 4, line 6).

Thus, the only stage at which Jacquemin performs disambiguation - and hence selection of one possible analysis as against another - is in the syntactic analysis stage. By contrast, in the morphological stage, Jacquemin preserves all of the possible analyses: "The output of the inflectional analyzer 802 is an inflected query 808 containing all possible lemmatizations" (col. 10, lines 63-65, emphasis added). In fact, Jacquemin teaches against the use of morphological analysis by itself in disambiguation: "For the task of information retrieval, the use of a rich morphological stemmer enhances recall but degrades precision..." (col. 3, lines 43-45). For this reason, Jacquemin takes the approach of performing initial morphological analysis to generate variants, and then using syntactic analysis to select the variants to preserve.

In claim 1 of the present patent application, on the other hand, morphological factors by themselves are used in selecting one or more of the analyses for disambiguation. The pattern of each of the analyses, i.e., the combination of linguistic features, is evaluated, without any necessary regard to the meaning or context of the base word (lemma) in question. On this basis, for example, the candidate analyses may be pruned according to the frequency of the respective patterns (page 5, lines 14-19, in the specification). This sort of pattern-based selection is neither taught nor suggested by the prior art.

In rejecting claim 1, the Examiner asserted Jacquemin discloses the claimed step of "evaluating the pattern of each of the analyses against a predefined criterion in order to select one or more of the analyses

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from the list" in col. 11, lines 6-11.   This passage
relates not to disambiguation, but to the operation of
Jacquemin's "derivational generator."   The function of
the derivational generator is "to create a maximum term
list for inflation" by "associat[ing] each lemma with a
list of morphologically related lexical entries from the
dictionary" (col. 6, lines 59-63).   It produces an
"expanded query," which "contains all possible terms
which could be created related to the original query"
(col. 11, lines 9-11, emphasis added).

In other words, far from evaluating or selecting one
or more analyses based on their respective morphological
patterns in order to disambiguate an input string, as
required by claim 1, Jacquemin's derivational generator
simply adds all possible morphological variants to a
query that has already been disambiguated.   Jacquemin
neither teaches nor suggests any sort of "predefined
criterion" against which the patterns should be compared
in order to select certain analyses.

Therefore, Applicant respectfully submits that claim
1 is patentable over Jacquemin.   In view of the
patentability of claim 1, claims 2-7, 13 and 14, which
depend from claim 1, are believed to be patentable, as
well.

Claims 22 and 29 recite, respectively, a computer
software product and apparatus that operate on principles
similar to the method recited in claim 1.   These claims
were rejected on grounds identical to the grounds of
rejection of claim 1, and the arguments above as to the
patentability of claim 1 thus apply to claims 22 and 29,
as well.   Therefore, Applicant respectfully submits that
claims 22 and 29 are patentable over Jacquemin, as are
claims 23-26 and 30-33, which depend from claims 22 and
29.

Claim 15 recites a method for searching a corpus of
text, which comprises morphologically analyzing the words

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in the corpus to generate a list of candidate analyses, and evaluating the pattern of each of the analyses in order to select one or more of the analyses from the list for each word. The lemmas of the selected analyses are entered in an index of the corpus, to which a search query may then be applied. As in claim 1, the lemma or lemmas to use for each word are selected by comparing the pattern of the word to a predefined criterion.

In rejecting claim 15, the Examiner cited essentially the same passage from Jacquemin (col. 11, lines 5-9) as was cited against claim 1. As noted above, however, this passage describes a process of inflating a term with all morphologically related lexical entries from a dictionary. There is no teaching or suggestion in this passage, or in any other part of Jacquemin, of evaluating the pattern of each of the analyses against a predefined criterion in order to select analyses from a list, as required by claim 15 (and claim 1). Therefore, Applicant respectfully submits that claim 15 is patentable over Jacquemin, as are claims 16-19, which depend from claim 15.

Claims 27 and 34 recite, respectively, a computer software product and apparatus that operate on principles similar to the method recited in claim 15. These claims were rejected on grounds identical to the grounds of rejection of claim 15, and the arguments above as to the patentability of claim 15 thus apply to claims 27 and 34, as well. Therefore, Applicant respectfully submits that claims 27 and 34 are patentable over Jacquemin, as are claims 28 and 35, which depend from claims 27 and 34.

Claims 8-12, 20 and 21 were rejected under 35 U.S.C. 103(a) over Jacquemin in view of Chanod et al. (U.S. Patent 6,393,389). Applicant respectfully traverses this rejection. In view of the patentability of claims 1 and 15, from which these claims depend, claims 8-12, 20 and 21 are believed to be patentable, as well. Although
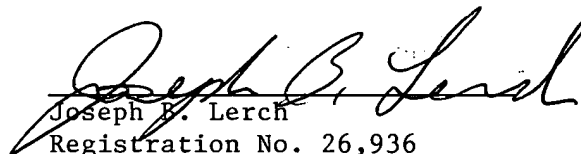
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Chanod describes selection of a translation (i.e., a
lexical entry) based on frequency of its occurrence,
there is no suggestion in either Jacquemin or Chanod of
selecting a morphological analysis based on the frequency
of its linguistic pattern.

Applicant has studied the additional references made
of record by the Examiner, and believes the claims in
this application to be patentable over these references,
as well, whether they are taken individually or in any
combination.

Applicant believes the remarks presented hereinabove
to be fully responsive to all of the grounds of rejection
raised by the Examiner. In view of these remarks,
Applicant respectfully submits that all of the claims in
the present application are in order for allowance.
Notice to this effect is hereby requested.

Respectfully submitted,

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